DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name:	**ATK - Thiokol Propulsion - Bacchus Works**
Facility Address:	**P.O. Box 98, Magna, Utah 84044-0098**
Facility EPA ID #:	**UTD001705029**

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

   Yes — If yes - check here and continue with #2 below

   If no - re-evaluate existing data, or

   If data are not available skip to #6 and enter "IN" (more information needed) status code

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. *Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be "contaminated"[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?*

	Yes	No	?	Rationale / Key Contaminants*
Groundwater	X			It was determined in 1985 that hazardous waste constituents were present in the groundwater. Alliant continues to monitor and investigate this release.
Air (indoors)[2]			X	The soil gas surveys have shown that volatile compounds are present in the ambient air.
Surface Soil (e.g., <2 ft)	X			The preliminary investigations have shown that there has been some impact to the surface soil at the Bacchus Works.
Surface Water	X			Contaminants have been detected in the springs and seeps around the NIROP Burning Grounds.
Sediment	X			Sediments deposited in earthen sumps are still under investigation.
Subsurf. Soil (e.g., >2 ft)			X	Investigations at the site have shown that hazardous constituents are present in the subsurface soils.
Air (outdoors)			X	The soil gas surveys have shown that volatile organic compounds are present in the ambient air.

** A list of the key contaminants can be found the table at the end of this section.*

If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

Yes — If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

If unknown (for any media) - skip to #6 and enter "IN" status code.

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[1] Acontamination" and Acontaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based Alevels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

Rationale and Reference(s):

Table 2A - Constituents of Concern for the Bacchus Works Facility

Contaminant	Media						
	Ground Water	Air (indoor)	Surface Soils (<2 ft)	Surface Water	Sediment	Subsurface Soils (>2 ft)	Air (outdoor)
Trichloroethylene (TCE)	X	X	X	X	X	X	X
1,1,1-Trichloroethane (TCA)	X	X	X	X	X	X	X
1,1-Dichloroethylene (DCE)	X	X		X		X	X
1,1-Dichloroethane (DCA)	X	X		X		X	X
Perchlorate	X		X	X		X	
1,1,2-Trichloro-1,2,2 - Trifloutoethane (Freon 113)	X	X				X	X
trans-1,2-Dichloroethylene	X	X		X		X	X
Chloroform	X	X					X
Ethyl Chloride	X	X					X
Vinyl Chloride	X	X					X
Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX)	X		X			X	
Cyclotetramethylene - Tetranitramine (HMX)			X		X		
Nitrate/Nitrite	X		X		X	X	
Nitroglycerin	X		X				
Lead			X		X		

Table 2A, identifies the contaminants that are known or suspected to be above appropriate risk-based standards. For example: the above table indicates that HMX is a COC in surface soils (<2 ft) and sediments. This determination was made because recent investigation of some of the earthen sumps determined the HMX was present in the surface soils or sediments in some sumps. Table 2B, lists the applicable drinking water standards for most of the COCs in Table 2A. Lead has been excluded from Table 2B because this constituent is not a groundwater contaminant at the Bacchus Works facility.

Given that additional investigative work needs to be done, the list of COCs may change over time. It is possible that some of the COCs on this list could be dropped or that additional contaminants could be added.

Table 2B - Drinking Water Standards

Contaminant	MCL (mg/l)	MCLG (mg/l)	DWEL (mg/l)	Health Advisories Lifetime Exposure (mg/l)	[illegible]	State MCLs (ug/l)	State Advisory Level (ug/l)	Region IX PRGs (ug/l)
Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX)	-	-	0.1	0.002	0.03	-	10	0.61
Cyclotetramethylene-Tetranitramine (HMX)	-	-	2	0.4	-	-	-	1800
Trichloroethylene (TCE)	0.005	0	0.2	-	0.02	1 - 3	3.2 - 30	1.6
1,1,1-Trichloroethane (TCA)	0.2	0.2	1	0.2	-	30	200 - 600	790
1,1-Dichloroethylene (DCE)	0.007	0.007	0.4	0.007	-	2 - 6	6 - 7	0.046
1,1-Dichloroethane (DCA)	0.005	0	-	-	0.06	5 - 50	5 - 850	810
Perchlorate	-	-	-	-	-		18	18
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon113)	-	-	-	-	-	1200	190 - 500 (mg/l)	59,000
trans-1,2-Dichloroethylene	0.1	0.1	0.7	0.1	-	10	60 - 100	120
Chloroform	0.08	0	0.4	-	0.001		0.49 - 60	0.16
Ethyl Chloride	-	-	0.1	0.003	-	-	140 - 400	4.6
Vinyl Chloride	0.002	0	-	-	0.002	0.2 - 2	0.015 - 2	0.02
Nitrate/Nitrite	10	10	-	-	-	-	-	10,000
Nitroglycerin	-	-	0.005	-	-	-	5	4.8

The information presented in Table 2B is a summary of the applicable drinking water standards and guidance for the list of COCs identified in Table 2A. Lead is the only COC missing from this table, which has a MCL of 0.05 mg/l.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential Human Receptors (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	Yes	No	No	No			Yes
Air (indoors)	Yes	Yes	Yes				
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	Yes	No	No
Surface Water	Yes	Yes			Yes	No	No
Sediment	No	Yes			Yes	No	No
Soil (subsurface e.g., >2 ft)				Yes			No
Air (outdoors)	Yes	Yes	Yes	Yes	Yes		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptor - spaces for Media which are not "contaminated" as identified in #2 above.
2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

Yes If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

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[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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Rationale and Reference(s):

Table 3A - Supporting Documentation for the Exposure Summary

Contaminated Media	Potential Human Receptors: Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food
Groundwater	Yes, the groundwater contamination at the Bacchus Works has migrated off-site and impacted two drinking water systems. Currently this pathway is being managed, but Kennecott workers could still be exposed to the contaminants in the groundwater.	No	No	No	na	na	Yes, water from the Kennecott drinking water system supplies two residences. This water could also be used to irrigate a private vegetable garden or fruit trees.
Air (indoors)	Yes. The soil gas survey found volatile compounds along the transects north of 4100 South.	Yes. The soil gas survey found volatile compounds off-gassing throughout the facility.	Yes, potential receptor. Due to the discovery of volatile compounds off-gassing north of 4100 South, ATK will need to determine if a day-care facility exist and assess the real or potential impacts.	na	na	na	na

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Table 3A - Supporting Documentation for the Exposure Summary

	Potential Human Receptors						
Contaminated Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food
Surface Soils (<2 ft)	No, residents would not have access to surface soil contamination.	Yes, this is a potential receptor, but it would be easy to manage any risk.	No, ATK has no on-site day-care facility.	Yes, potential receptor, but risk could be easily managed.	Yes, trespassers could enter the Bacchus Works and come in contact with surface soils. ATK is currently controlling this potential pathway by restricting access at the facility fence and regular security patrols.	No, there is no recreational use of the Bacchus Works.	No, there is no known surface soil contamination off-site and no crops are produced on-site.
Surface Water	Yes, volatile compounds and perchlorate are present in the seeps and springs in the Coon Creek drainage. The general public would have access to Coon Creek after it leaves the site.	Yes, volatile compounds and perchlorate are present in the seeps and springs in the Coon Creek drainage. These seeps and springs also support the wetlands around the NIROP Burning Grounds. Employees have access to this area.	na	na	Yes, trespassers could enter the Bacchus Works and come in contact with surface waters around the Coon Creek drainage, but ATK is currently restricting access to this area with the facility fence and regular security patrols.	No, there is no recreational use of the Bacchus Works.	No, this water is not used for irrigation.
Sediment	No, residents would not have access to surface soil contamination.	Yes, workers would have access to sediments.	na	na	Yes, trespassers could enter the Bacchus Works and come in contact with sediments. ATK is currently restricting access to the sediments with the facility fence and regular security patrols.	No, there is no recreational use of the Bacchus Works.	No, there are no crops produced on-site.

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Table 3A - Supporting Documentation for the Exposure Summary

Contaminated Media	Potential Human Receptors: Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food
Subsurface Soils (>2 ft)	na	na	na	Yes, construction activities could provide a complete pathway, but it could be easily managed to minimize the risk.	na	na	No, the contaminants in subsurface soils are confined to the Bacchus Work site where no crops are under cultivation.
Air (outdoors)	Yes, the soil gas survey has established that volatile organic compounds are present in the ambient air off-site of the facility.	Yes, the soil gas survey has established that volatile organic compounds are present in the on-site ambient air.	Yes, since the soil gas survey established that volatile organic compounds are present in the off-site ambient air, this pathway could be complete.	Yes, construction workers could be exposed to volatile organic compounds during activities both on and off the site.	Yes, trespassers could be exposed to volatile organic compounds both on and off site.	na	na

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be "**significant**"[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

Yes If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

The above answer best fits what we know about this site, however, 'Yes' does not fit all of the potential exposures pathways. Exposures to indoor and outdoor air would best be characterized using the 'IN' status code, because it is uncertain whether this would present a significant exposure to the contaminants.

Groundwater is the only pathway where contaminant concentrations are approaching regulatory standards or guidance, and the exposure potential could be reasonably expected to be significant. However, through voluntary efforts, Kennecott is managing the potential risk by informing employees that the contamination exists in the facility's drinking water system, installing reverse osmosis treatment systems on taps around the plant and providing employees with bottled drinking water.

Indoor and outdoor air may have a significant exposure potential, however, this pathway would best be characterized using the "IN" status code. The reason for the "IN" status code is the uncertainties surrounding the potential risk. It is known that volatile organic compounds are present in the both the on- and off-site ambient air, but risk exposure potential has not been evaluated. After the exposure potential has been evaluated, we can determine whether this would constitute a significant exposure.

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

IN If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code.

Rationale and Reference(s):

The reason behind selecting the 'IN' status code for this question are the unknowns associated with the indoor and outdoor air exposure pathway. To the best of our knowledge, groundwater is currently under control. The reasons and rationale for this determination are: 1) Kennecott's current controls should minimize potential risks; 2) The primary COC that would create an unacceptable risk to human health is perchlorate, which appears to be below concentrations that would adversely affect adults; 3) The potential that children would be exposed to Kennecott's drinking water are minimal.

With respect to the potential on-site exposures, only indoor and outdoor air are unknowns. All of the other exposure pathways can be easily managed through education, signage and fencing, and all of the sites where contamination exists are outside current production operations.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the **ATK - Thiokol Propulsion, Bacchus Works** facility, EPA ID #: **UTD001705029**, located at **P.O. Box 98, Magna, Utah 84044-0098** under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

NO - "Current Human Exposures" are NOT "Under Control."

IN IN - More information is needed to make a determination.

Completed by	(signature)	WM Wall	Date	10/4/2002
	(print)	**William M. Wallner**		
	(title)	**Environmental Scientist**		

Supervisor	(signature)	Bradley C. Maulding	Date	10/4/02
	(print)	**Bradley C. Maulding**		
	(title)	**Environmental Program Manager**		
	(EPA Region or State)	Utah		

Locations where References may be found:
All of the information used to complete this evaluation are located in the facility files for the ATK - Bacchus Works facility. These files are available for review during normal working hours at the offices of the Utah Division of Solid and Hazardous Waste. The offices are located on the 4th floor of the Martha Hughes Cannon Health Building, 288 North 1460 West, Salt Lake City, Utah.

Contact telephone and e-mail numbers

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.